

Synthesizing Art and Science

A Collaborative Approach to Understanding Intergroup Relations and Contributing to Social Change.

Einat Amir



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Synthesizing Art and Science

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This thesis examines the vital role artists can play in shaping individuals and societies, emphasizing art as an impactful force that can foster a more inclusive, empathetic world. It explores the concept of synthesizing art and science, suggesting that equal collaborations between these fields can yield innovative solutions to contemporary 'Wicked' problems. This thesis is situated within the interdisciplinary domains of socially engaged research, ArtScience, and artistic research, with a special focus on the relationships between participatory performance art and social psychology.

This research agenda is composed of both the written and artistic components. It presents an analysis of innovative ArtScience interdisciplinary research methods and hinges on the role and efficacy of art, from collective transformation to personal engagement. Component 1 responds to why there exists a need for equal collaborations between scientists and artists, and how such collaborations could contribute to society. Underlining that artists are needed more than ever during challenging times, this study advocates for their crucial integration into all societal and environmental change initiatives. Component 2 shows empirical evidence from multiple studies of how the synthesis of art and science, specifically performance art with social psychology, contributes to improving prosocial behaviors by elevating empathy towards individuals from marginalized groups in different societies. Component 3 presents a tangible example of the synthesis of a social psychology field experiment with participatory performance art. As an artwork rather than an academic article, this component offers an opportunity for experiential understanding through direct emotional and aesthetic engagement, as opposed to merely analytical comprehension. Finally, component 4 illuminates the significance of art for the individual self, positioning narrative-based art as a safe space for emotional exploration, devoid of real-life social consequences.

Drawing upon the dynamic interplay between scientific research and artistic practice, this thesis positions research as the confluence between theory and practice, unearthing new knowledge. The synthesis of art and science in collaborative ventures offers enormous possibilities for innovative research. Beyond this, it has a multifaceted impact—it can educate, influence, and evoke change in individuals and societies in multiple ways.

Keywords ArtScience, interdisciplinary, collaboration, social psychology, applied research, socially engaged research, socially engaged art, performance art, empathy, narrative-based art, transportation, the self, cognitive neuroscience.

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Fig. 1. Einat Amir & Yossi Hasson, *Basic Assumption*, 2017. Still image from a video shown in the performance-experiment.

Acknowledgments

My journey would not be the same without my long-time collaborator and friend, Yossi Hasson, who co-created most of the components of this dissertation. I cannot imagine having a better partner. I look forward with eagerness to our continued collaboration and express to you my heartfelt appreciation. A decade ago, Megha Ralapati and Adam Waytz first enlightened me on the relevance of social psychology to my art. I thank them for unveiling this unimagined world. My deep gratitude goes to Professor Eran Halperin from the Hebrew University. By welcoming an artist into his social psychology lab, he sparked my newfound passion for social science and transformed my life.

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including my work, so much better. Thank you my lovely Hinda Weiss for showing up strong when I need a friend. I would like to thank my parents, Eitan and Varda, who raised me to be confident in my creativity and intellectual ability and for supporting my decision to build a new life in Finland.

Finally, I dedicate this work to my beloved grandmother, Waltraud-Ayala. Although she had to escape Nazi Germany as a child and lived her whole life in Israel-Palestine, she took the unconventional step of reclaiming her right to European citizenship months before her passing, in order to bequeath it to her grandchildren and give us the possibility of a different life. This act not only symbolized her strength and compassion but also opened a door for me to live and work in Finland. Her legacy presents a tremendous gift and inspiration that I carry with pride.

List of thesis components

1. Einat Amir & Yossi Hasson (2024), Towards Equitable ArtScience Collaborations: Synthesizing Performance Art and Social Psychology for Social Change. Leonardo Journal (accepted, in press).
2. Yossi Hasson & Einat Amir (first co-authors), Danit Sobol-Sarag, Maya Tamir, and Eran Halperin (2022). Using performance art to promote intergroup prosociality by cultivating the belief that empathy is unlimited. Nature Communications Journal. <https://doi.org/10.1038/s41467-022-35235-z>
3. Einat Amir & Yossi Hasson, Relative Distance (artistic component, peer-reviewed and approved), 2021. Performance-Experiment commissioned by Kampnagel Theater, Hamburg, Germany.
4. Einat Amir, Joshua Sofaer, and Mikko Sams (2022), Act of Fiction - Simultaneously experienced multiple perspectives of (un)reality when engaging with narrative-based art. Leonardo Journal, https://doi.org/10.1162/leon_a_02362

Author's contribution

General description of the first co-authorships of Publications 1, 2, 3:

Einat Amir and Yossi Hasson are long-time collaborators. They have established a work process that involves an elaborate blurring of the roles of the scientist and the artist. In this conceptual framework, they worked on most aspects of the projects together. From writing the hypothesis to researching past work done in both fields, and from writing scripts for preliminary online experiments to writing performance scripts, working with performers, creating installations, and more, including all the decisions involved. However, naturally, each has their own specialized knowledge and leads certain aspects of the work accordingly.

Publication 1: First co-author.

Towards Equitable ArtScience Collaborations: Synthesizing Performance Art and Social Psychology for Social Change.

Einat Amir wrote the majority of the article's text and finalized it, under the supervision of Helena Sederholm.

Publication 2: First co-author.

Using performance art to promote intergroup prosociality by cultivating the belief that empathy is unlimited.

Einat Amir is the artistic leader and the initiator of Studies 4,5 in the article (performance-experiments projects), and Hasson is the scientific leader and initiator of studies 1–3 in the article (preliminary experiments). Einat Amir was responsible for the artistic context, production, and funding allocation of the performance-experiments, as well as directing the films and performances involved. and Hasson was responsible for the data gathering and analysis. Hasson wrote most of the article text and finalized it, under the supervision of Eran Halperin.

Publication 3: First co-author.

Relative Distance (artistic component, peer-reviewed and approved).

Einat Amir is the artistic leader and the initiator of this performance-experiment, and the recipient of the commission from Kampnagel Theater Hamburg. Hasson is the scientific leader. Einat Amir was responsible for the artistic context and the production of this project, and Hasson was responsible for the data gathering and analysis.

Publication 4: First author.

Act of Fiction - Simultaneously experienced multiple perspectives of (un)reality when engaging with narrative-based art.

Article concept by Einat Amir, Joshua Sofaer, and Mikko Sams. Einat Amir was responsible for writing the “Act of Fiction” section, the literature review, the abstract, and the conclusion. “Introduction” was written by Einat Amir and Joshua Sofaer. Einat Amir edited all parts of the manuscript and finalized it, under the supervision of Mikko Sams.

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A – Introduction

A1. Introduction: Artist(ic Positioning) Among Scientists.

As a performance artist and socially engaged art researcher, I always strived for my projects to have a greater societal impact. Having grown in a reality of violence, conflict, and inequality, my work has always aimed to break barriers, communicate effectively, listen to silenced voices, and challenge broken systems. A decade ago, following years of investigating human interactions and power relations through participatory performance art practice, I stumbled upon social psychology articles that explore the role of emotions within intergroup conflict contexts. I discovered that both the sphere of participatory performance in the realm of contemporary art and the domain of social psychology concerning emotions in intergroup interactions and conflict share numerous mutual interests. I was drawn to these experiments, reading articles while focusing primarily on the description of the manipulations, which have a lot in common with socially engaged performance art. I found myself thinking about ways to collaborate with these researchers, take innovative concepts of emotional interventions, and enhance them through my artistic-performative knowledge.

That is when I decided to join the lab of Professor Eran Halperin. The Psychology of Intergroup Conflict and Reconciliation (PICR) laboratory at The Hebrew University in Jerusalem focuses on understanding the psychological mechanisms governing the dynamics in intergroup conflicts. Prof. Halperin had generously granted me free access to all laboratory activities and research. My collaboration with the laboratory was initially thought of in the tradition of the Artist Placement Group. The Artist Placement Group (APG, est.1966, UK) coordinated and facilitated "placements" for artists in commercial and public organizations. During these placements, artists conducted research, worked on projects, and

created art. This concept is essentially different from “artist residencies” that are organized to accommodate the artists’ needs. APG solicited institutions to open their doors to an artist, arguing that both the artists and the organizations would benefit from the artist's presence (Eleey, 2007).

The APG model is similar to my engagement with PICR lab in the sense that I was working in a professional environment not designed for artistic work, and also that I had to redefine my artistic practice in relation to it. However, my time in PICR is also distinctly different from this model since my stated intent was to fully collaborate with social psychologists and to synthesize social psychology and performance art, rather than to create an independent artistic project that reacts to the work of the employees (in this case, social psychologists) in the new environment.

Through the years, my presence there became more natural for everyone, and I started to see myself simply as a lab member. My aim was to better understand how individual emotions affect conflict between societal-national groups and collaborate with social and political psychologists to create performance-experiment hybrids and affect societal change. I attended weekly laboratory meetings and held introductory meetings with individual researchers in the laboratory. Yossi Hasson approached me after a presentation I did for the lab members about my artistic practice. He was doing his social psychology Ph.D. in Halperin’s lab at the time and was focusing on ways to increase intergroup empathy between groups in intractable conflict. When we discussed our first meeting years later, he said “Your performance setups seemed like such a great way to make people interested and excited about participating in an experiment! And also you seemed like a nice person.” I felt the same – that he was, is, someone I enjoy talking to – which proved to be one of the key elements for a successful collaboration (see component 1), and also that his ideas about how to transform my performative work into an empathy field experiment, were not only thrilling but also seemed practical (another key element for a successful collaboration).

In parallel to the beginning of my dialogue with Hasson, I was invited to develop a large-scale participatory performance work for a local art festival. I proposed a project that consisted of a collaboration between Hasson and myself, a participatory performance that is also a social psychology field experiment. My proposal was accepted, and our collaborative journey had begun. This project was a major production in both the artistic and scientific sense and required an interdisciplinary collaboration also on the organizational level, where the head of the social psychology lab and the head of the art festival found themselves having multiple meetings together, trying to figure out how to divide the budget between them since it was not possible to separate what was an artistic component and what was a scientific one.

Hasson and I started what would become our long-term collaboration, which above all feels like an ongoing exchange of ideas on how to create, while reclaiming and gifting new liberties to each other. Canceling the imagined hierarchies between art and science, cheerfully skipping over the “Two Cultures” hurdle (Snow, 1959). Treating art and science as two equal forms of human creation, created to better understand the world. Neither of which is “the truth”. In our collaborative process, the lines between scientific and artistic work are intentionally blurred. We jointly undertake all project aspects and participate in all essential decision-making processes together.

In parallel to my work with Hasson, I have been employed as a doctoral researcher at Aalto University through the Experience Platform, working interdisciplinarily in the Department of Art & Media and the Department of Neuroscience & Biomedical Engineering (NBE), with co-supervision from both departments. At NBE, I joined the Brain and Mind Lab, and attended the weekly lab meetings. Additionally, I joined cognitive neuroscience courses in order to enhance my potential to have fruitful, educated dialogues in this environment. My new placement at NBE, enabled me to collaborate with cognitive neuroscientists, namely with Professor Mikko Sams. Together, we explored the significance of narrative-based art to the human mind. The collaboration with Sams and artist Joshua Sofaer enabled me to experience a completely new way to synthesize art and science – by creating together a new concept (“Act of Fiction”, see component 4) and then using artistic and scientific knowledge to understand it and demonstrate it. And by, additionally, creating an academic article that uses a synthesis of artistic and scientific writing in order to exemplify the Act of Fiction while describing it.

These unique “in-between” positions, of being an artist in scientific environments, enabled me to understand the needs of artists and scientists in collaborations and to establish my research in the interdisciplinary realm, with a focus on the complexity of ArtScience collaborations.

A2. Objectives and Research Questions

In all components of this thesis, I focus on both the artistic aspects of the presented collaborations, as well as on the creation and analysis of innovative ArtScience interdisciplinary research methods. This research agenda is composed of both the written and artistic components. I explore:

RQ1: How can scientists and artists create better collaborations, that support societal and environmental change?

RQ2: Why should scientists collaborate with artists? And why should artists collaborate with scientists?

In the context of these wider, general research questions, I also had the opportunity to collaborate with scientists through shared interests. While these collaborations enriched my primary research themes, they also led to the exploration of topics closely aligned with the scientists' respective fields of expertise—Hasson with a focus on empathy and Sams investigating concepts of the mind and the self. The integration of our interests resulted in additional, more targeted, research questions:

RQ3: In what ways could the synthesis of social psychology and performance art contribute to social change, and specifically elevate empathy levels toward marginalized groups? (explored by components 2–3).

RQ4: In what ways could the synthesis of social psychology and performance art contribute to both art and psychology? (explored by components 1–3).

RQ5: What is the significance of narrative-based art to the human mind? (explored by component 4).

A3. Thesis Structure

This thesis comprises four distinct components. These components include two published peer-reviewed research articles (components 2 and 4), another peer-reviewed article currently in press (component 1), as well as a peer-reviewed performance-experiment project (component 3). In the spirit of this thesis, which argues for equal treatment of art and science, I opted to term all parts of this thesis as 'components' to emphasize their equal importance and to avoid creating any hierarchal or differential treatment among them. Each component contributes uniquely to the overall understanding and production of knowledge presented in this thesis. The arrangement of the components in this thesis starts with the most recent one, placing it at the forefront as it offers a reflective overview that is relevant to all the other components. It provides meaningful context and binds the other elements together. Components 1 to 3 are all outcomes of my collaborative research with social psychologist Yossi Hasson. Component 4 stems from a separate ArtScience collaboration done with cognitive neuroscientist Mikko Sams and artist Joshua Sofaer.

The structure of this thesis is tailored to facilitate a comprehensive understanding of the research, as well as to reflect the interdisciplinary nature of the investigations undertaken. It begins with contextual reflections on two

major themes, firstly it discusses the artistic research approach (A4.2), and then the conceptual approach to ArtScience collaborations (A4.3). An overview of the academic publications and the artistic component is then provided (A5). Key terminologies used throughout the research are then reflected upon in the form of Q&A (A6), setting the stage for a comprehensive discussion of the research methods (A7) and the ethical considerations adhered to in the thesis (A8).

The research contributions section (B) provides an in-depth discussion of the artistic-scientific contributions of this thesis, divided into three main subjects: contributions to the field of ArtScience collaborations (B2) and then, the contributions to the synthesis of performance art and social psychology is discussed (B3), and finally the contributions to the understanding of the importance of narrative-based art to the human mind (B4). A detailed description of the artistic component and its placement within the framework of the research is presented (B5), concluding with the other components of this thesis – the three articles (B6).

Finally, in the summary section (C), the entire thesis is brought together with a concise overview of the research conclusions (C1), shedding light on the implications of the findings. Proposed future directions (C2) offer a hint at potential future research stemming from this investigation, and possible ways of expanding on the knowledge, understanding, and conclusions uncovered.

A4.1. Reflections Preface

This thesis is situated within the interdisciplinary domains of ArtScience, artistic research, and socially engaged research. It also resides within the complex contemporary history of the relationships between performance art and social psychology. In this section, I will discuss the meanings of these terms in the artistic and scientific context and where they intersect. I will aim to tackle the questions—how can one define artistic research? How does the "two cultures" perspective affect current collaborations between art and science? And—why should art and science be combined? Addressing these issues beckons a preliminary comprehension of the academic and artistic context of this thesis.

A4.2. Reflection on Artistic Research

In my late twenties, I used to work as an art galleries tour guide in New York City. I would lead groups of tourists who hired me to add a more “high culture” angle to their visit to the iconic city. And even though I did my best to choose shows that were “crowd pleasers” and “wider audience friendly”, almost every single time, there was someone in the group who pointed at some non-conventional artwork and asked, “But why is this considered art?” For decades, non-professional art viewers have been questioning innovative art in the same way—by doubting its right to be categorized under the same definition as, say—the great Italian Renaissance masters. This issue matters because categorizations determine the ways we think about things.

Artistic Research is suffering from the same problem. As a young academic research field that is based on the ever-evasive and ever-changing artistic act, Artistic Research has been questioned, doubted, and undermined, and its definition has been constantly changing and debated. As a tour guide, I answered the “But why is this art?” provocation always in the same way: “It is art because it was created by an artist, in an artistic context, and with artistic intentions.” Esa Kirkkopelto has a similar solution to the “what is artistic research” problem: “Artistic research is research conducted in an art institution, for instance in an art university” (Kirkkopelto 2015, p.49), he argues in simple clarity.

Henk Borgdorff sees artistic research as “when that artistic practice is not only the result of the research, but also its methodological vehicle, when the research unfolds in and through the acts of creating and performing” (Borgdorff 2011, p.46). Similarly, according to Shaun McNiff, artistic research is characterized by “The systematic use of the artistic process, the actual making of artistic expressions in all of the different forms of the arts, as a primary way of understanding and examining experience by both researchers and the people that they involve in their studies” (McNiff 2008, p.29).

In the literature dealing with artistic research, there has been a lot of discussion about what kind of information can be produced through the means of art, and whether artistic research should produce new information. Several researchers address the relationship between the knowledge produced by artistic research and scientific practice, which is an especially relevant angle to this thesis. Koskinen (2018, p.102) argues that artistic research can be looked at as artistic knowledge production, therefore, it is vital as a connecting thread in ArtScience collaboration, as the kind of knowledge produced by means of art that scientists can use. Kathrin Busch provides several definitions of artistic research, some of which suggest a close relationship between art and science.

One of her suggestions is referring to artistic practice in an academic framework, in which art is treated on a scientific basis. “It assumes that art is based in theoretical knowledge, that art can be learned, and that it can be further developed through scientific practice” (Busch 2009, p.3). This definition is based on the notion that the nature of art cannot be defined or categorized, and therefore artistic practice can only be “the critique of other practices or the presentation of forms that seek to defy classification” (Cazeaux 2018, p.36). This definition of artistic research is in line with my artistic practice, which seeks to treat artistic research and social psychology research as inseparable and indistinct. For example, when one is taking part in my performance-experiments, my intention is that they would not be able to tell which components are artistic practice and which are psychological research.

Barbara Bolt proposes that a performative approach could present an alternative method for research within the artistic discipline and potentially extend to social science fields, where the gathered data often falls short of elucidating complicated phenomena (Bolt, 2016, p.129). In my collaborative work with Dr. Hasson, we combine artistic practice-led research with social psychology experiments, resulting in performance artworks as well as academic articles, with quantitative research in the field of social psychology. Our methodology includes gathering data from the performance-experiment participants (informed and consenting) through questionnaires that are integrated seamlessly into the performative experience.

A4.3. Reflection on ArtScience Collaborations

The two Cultures

In his seminal essay “The Two Cultures”, C.P. Snow describes his peers as two groups who think poorly of each other. One is a group of science scholars and the other is a group of literary writers. The writers see the scientists as shallow and unaware of emotions, and the scientists see the writers as non-visionary and self-centered. Snow, being somewhat of both a scientist and a writer, is frustrated by this unnecessary conflict: “Anyone with a mild talent for invective could produce plenty of this kind of subterranean back-chat. On each side there is some of it which is not entirely baseless. It is all destructive. Much of it rests on misinterpretations which are dangerous” (Snow, 1959, p.3).

The “Two Cultures” view presented by Snow is still common nowadays. The assumption that underpins the Two Cultures perspective is that the culture of the arts and humanities fundamentally differs from that of the sciences. An advocate of this viewpoint may highlight the significance of individual experience and unique, experiential artistic knowledge, in stark contrast to the impersonal objectivity and universal principles sought in the scientific world (Bullot & Seeley et al. 2017, p.453).

However, art and science can also be looked at as codependent complementing entities. Catherine Elgin voiced a pivotal perspective that advocates for a Codependence Thesis. She asserts that “the arts and the sciences perform many of the same cognitive functions, both serving to advance understanding” (Elgin 1993, p.13). Both arts and sciences utilize exemplification to emphasize, underline, transmit, or summarize information. This shared utilization of exemplification in both fields implies that arts and sciences depend on a shared set of cognitive abilities. Specifically, these are the perceptual and inferential skills necessary for understanding and applying exemplification.

Currently, in Europe, where this thesis is written, scientists and artists do a relatively large amount of research collaborations. There are at least two reasons for this. The development of artistic and art-based research and artistic doctoral education are advanced and trending, which from time to time brings artists and scientists to the same research topics. In addition, cooperation is supported by societal and environmental EU funding (Koskinen 2018, p.93). I argue that the current trend of ArtScience collaboration is still very much affected by the polarizing “Two Cultures” perspective, rather than the codependence perspective. A wider review of the complexity of current ArtScience collaborations is included in Component 1.

Most collaborations between art and science are unequal and primarily motivated by the interests of one contributor, catering predominantly to one party's motivations. This tendency is evident in various books and online resources that display ArtScience collaborations. These mostly consist of projects that evidently leverage artistic work for scientific study or produce art that exploits existing scientific discoveries, rather than striving towards a genuine fusion of disciplines (thesis component 1, p.4–5).

A true ArtScience collaboration should entail the mutual exchange and development of ideas in an equitable environment. It is not merely an opportunity for artists to learn from scientists without contributing, nor is it about artists enhancing the aesthetic appeal of scientific work. True collaboration recognizes that every participant brings expert knowledge and skills to the table, contributing equally to the creative process. This ethos of reciprocal respect and contribution should underpin every ArtScience partnership (Schnugg 2019, p. 227). For instance, ensuring that both artists and

scientists have secured funding is crucial for maintaining an equal and justified standing within the project. This prevents any reliance on individual generosity, fostering a more balanced and productive collaborative environment.

Why ArtScience?

In 2018, the U.S National Academies of Sciences, Engineering, and Medicine established a 22-member committee tasked with investigating the claim that educational programs integrating the humanities and arts with science, technology, engineering, mathematics, and medicine (STEMM) enhance educational and career outcomes for undergraduate and graduate students. The committee undertook a thorough examination and analysis to evaluate the effects of these integrative educational approaches (Skorton & Bear 2018, p.2). Their findings were clear: “After considering multiple forms of evidence, the committee found that certain approaches to the integration of the arts and humanities with science, technology, engineering, mathematics, and medicine (STEMM) are associated with positive student learning outcomes, including, but not limited to, written and oral communication skills, teamwork skills, ethical decision making, critical thinking and deeper learning, content mastery, general engagement and enjoyment of learning, empathy, resilience, the ability to apply knowledge in real-world settings, and indicators of improved science literacy” (Skorton & Bear 2018, p.170). These diverse, overwhelmingly positive conclusions about the contribution of Art-Science integration to individuals are significant, specifically in the field of higher education, where research about the value of interdisciplinary approaches is still inadequate (Skorton & Bear 2018, p.4).

Research about the importance of interdisciplinary methods to society, however, has been emerging for several decades (Frodeman & Thompson et al. 2017, p.4). It has been widely discussed, for example, in the context of Wicked Problems, a term that was coined by Horst Rittel and Melvin Webber, at the University of California, Berkeley, 1973. Such problems are notoriously resistant to conventional solutions due to their complex nature, stemming from a web of intertwined, variable, and often conflicting issues (Rittel & Webber 1973, p.155). Currently, the most significant issues requiring joint efforts for resolution include sustainability, climate change, societal shifts prompted by emerging technologies, the risk posed by new and evolving diseases, and immigration-related societal issues (a subject that is interdisciplinarily addressed in components 1–3 of this thesis). Attempts to resolve these problems with unilateral, discipline-specific methods typically exacerbate the situation. Addressing Wicked problems demands the collective efforts of interdisciplinary teams over extended periods, as these issues are too intricate for straightforward resolutions. Instead, the goal is to gradually enhance the situation through collaborative endeavors (Erlhoff & Marshall 2008, p.447).

In correlation to the acknowledgment of the importance of interdisciplinary research, a growing number of research institutions are embracing multifaceted interdisciplinary approaches, particularly in addressing Wicked problems. As discussed in component 1, these innovations often exclude artists due to a lack of widespread recognition for art's role in complex problem-solving (component 1, p.2). Nonetheless, collaborations between the arts and sciences are gaining momentum globally, with centers dedicated to such interdisciplinary exchanges emerging as influential models. Prominent examples include the MIT Media Lab, SymbioticA at the University of Western Australia, and the Art|Sci Center at UCLA, along with initiatives by The Leonardo group. These hubs have inspired the creation of similar departments and centers at other universities. Additionally, forums for dialogue and collaboration like Le Laboratoire and The Laboratory at Harvard are being established worldwide (Born & Barry 2016 p.8, Schnugg 2019, p.235). Newer initiatives are also on the rise, for example, the SEADS Collective, the CAA Contemporary Art Archipelago, and Labodanse at CNRS. However, this burgeoning field is predominantly influenced by Northern American, European, and Australian perspectives, encountering limited interaction with cultures outside of these domains. The few cross-cultural exchanges within ArtScience collaborations that occur highlight their potential value and insights, underscoring the need for broader cultural diversity and inclusion in these endeavors (Schnugg 2019, p.236).

In 2011, inspired by some of the initiatives mentioned above, Bob Root-Bernstein, Todd Siler, Adam Brown, and Kenneth Snelson collaborated to write the “ArtScience manifesto” (Root-Bernstein & Siler et al. 2011). Their manifesto, though quite abstract, can be seen as an inspiring starting point for discussions among contemporary ArtScience researchers, including the author of this thesis. The concepts they proposed are being actively explored and have yet to be fully realized. This manifesto is also the reason the term “ArtScience” is preferred in this thesis over other variants like Art-Science or Art/science. The entirety of the manifesto is presented as figure 2.

ArtScience Manifesto:

- 1) Everything can be understood through art but that understanding is incomplete.
- 2) Everything can be understood through science but that understanding is incomplete.
- 3) ArtScience enables us to achieve a more complete and universal understanding of things.
- 4) ArtScience involves understanding the human experience of nature through the synthesis of artistic and scientific modes of exploration and expression.
- 5) ArtScience melds subjective, sensory, emotional, and personal understanding with objective, analytical, rational, public understanding.
- 6) ArtScience embodies the convergence of artistic and scientific processes and skills, not from their products.
- 7) ArtScience is not Art + Science or Art-and-Science or Art/Science, in which the components retain their disciplinary distinctions and compartmentalization.
- 8) ArtScience transcends and integrates all disciplines or forms of knowledge.
- 9) One who practices ArtScience is both an Artist and a Scientist simultaneously, and one who produces things that are both artistic and scientific simultaneously.
- 10) Every major artistic advance, technological breakthrough, scientific discovery, and medical innovation since the beginning of civilization has resulted from the process of ArtScience.
- 11) Every major inventor and innovator in history was an ArtScience practitioner.
- 12) We must teach Art, Science, Technology, Engineering, and Mathematics as integrated disciplines, not separately.
- 13) We must create curricula based in the history, philosophy, and practice of ArtScience, using best practices in experiential learning.
- 14) The vision of ArtScience is the re-humanization of all knowledge.
- 15) The mission of ArtScience is the re-integration of all knowledge.
- 16) The goal of ArtScience is to cultivate a New Renaissance.
- 17) The objective of ArtScience is to inspire open-mindedness, curiosity, creativity, imagination, critical thinking, problem solving, and innovation through innovation and collaboration!

ArtScience, in sum, *connects*. The future of humanity and civil society depend on these connections. ArtScience is a new way to explore culture, society, human experience, that is synaesthetic experience integrated with analytical exploration. It is knowing, analyzing, experiencing and feeling simultaneously.

Fig. 2. Root-Bernstein, Bob, Todd Siler, Adam Brown, and Kenneth Snelson. "Artscience Manifesto" Leonardo 44, no. 3 (June 2011): 192.

A5. Overview of the Academic Publications and the Artistic Component.

Publication 1 - Journal Article

Title: Towards Equitable ArtScience Collaborations: Synthesizing Performance Art and Social Psychology for Social Change.

Keywords: ArtScience, non-binary research, interdisciplinary, collaboration, social psychology, applied research, socially engaged research, socially engaged art, performance art, empathy.

Research Questions:

1. What are the current challenges in ArtScience collaborations?
2. What can “Equitable ArtScience Collaborations” consist of?
3. In what ways could the synthesis of performance art and social psychology contribute to both fields?
4. How can collaborations between artists and scientists contribute to solving today’s Wicked problems?

Research Approach: Conceptual/theoretical article

Research Contributions:

1. Most collaborations between art and science are unequal and mainly prioritize one contributor's interests. The article emphasizes the need for equitable forms of collaboration, wherein all participants are considered equal leaders and are encouraged to expand their expertise.
2. The article explores the concept of synthesizing art and science, suggesting that equal partnerships between these fields can yield innovative solutions to contemporary societal and environmental challenges.
3. The synthesis of performance art and social psychology lies in the exploration of experience, empathy, and human behavior. Both disciplines strive to examine human emotions and actions, often within a societal backdrop. Uniting them offers a special fusion of creativity and data-driven analysis, enriching the research process.
4. The article proposes a "Non-Binary Research" model that challenges the traditional segregation of arts and sciences, allowing for a more holistic and integrative approach.
5. The article demonstrates how socially engaged research done in ArtScience collaboration can support societal change.
6. The article provides a set of recommendations for successful collaborations between art and science, creating a practical guide for future interdisciplinary collaborations.

Publication 2 - Journal Article

Title: Using Performance Art to Promote Intergroup Prosociality by Cultivating the Belief that Empathy is Unlimited.

Keywords: performance art, social psychology, intergroup prosociality, empathy, intervention, zero-sum bias, intergroup discrimination, field experiment, ArtScience, applied research, socially engaged research.

Research approach: Six studies (4 online, 2 field), quantitative data collection and analysis.

Research Questions:

1. How does the belief that empathy is limited affect outgroup empathy?
2. Can the belief that empathy is unlimited increase outgroup empathy?
3. What are the effects of believing that empathy is unlimited on support for prosocial actions toward outgroup members and empathic behaviors in face-to-face intergroup interactions?

Research Contributions:

1. The article provides empirical evidence that people often feel less empathy toward outgroup members due to the belief that empathy is a limited resource.
2. The authors developed an intervention that increases the belief that empathy is unlimited, which in turn increases outgroup empathic behaviors.
3. The authors found that leading people to believe that empathy is unlimited leads to greater support for prosocial actions toward outgroup members and encourages more empathic behaviors toward outgroup members in face-to-face intergroup interactions.
4. These intervention effects were observed across various intergroup contexts involving different ethnic, national, religious, and political groups (generalizability).
5. The article proposes that performance art can be an effective medium for conveying the belief that empathy is unlimited and promoting social change.

Publication 3 -Artistic component

Title: Relative Distance

Keywords: Covid-19, performance-experiment, performance art, social psychology, minoritized group, dominant group, Germany, Chicago, empathy, ArtScience, socially engaged research, participatory, online art.

Research Approach: Participatory performance art synthesized with social psychology experiment.

Research questions:

1. What are the varying experiences of gain and loss among people of different nationalities during the COVID-19 pandemic?
2. How can the combination of visual and emotional stimuli, performative techniques, and humor be used to engage audiences and navigate challenging or sensitive topics?
3. How can the combination of performance art and psychological research facilitate meaningful discussions on emotionally charged topics while maintaining an intimate and supportive environment?
4. In what ways can digital platforms like Zoom bridge geographical differences between performers and audiences, creating a sense of closeness even during periods of isolation?
5. How can digital communication platforms be effectively utilized for performance arts and audience interaction, particularly in a time of physical distancing?
6. Does the order of presenting ingroup/outgroup stories affect the empathy levels towards the outgroup? And does the order of presenting ingroup/outgroup stories affect the empathy levels towards the ingroup?

Research Contributions:

1. The project provides materials for future qualitative research regarding the diverse experiences of gain and loss of people of different nationalities during the COVID-19 pandemic.
2. The project presents a unique blend of visual and emotional stimuli to engage the audience, making use of performative techniques and humor to navigate challenging and sensitive subjects.
3. The project invokes both contentious issues and personal sentiments, such as perceptions towards refugees or exiles and participants' national identities and sense of belonging.
4. The project creates a platform for discussion on loaded emotional topics while still prioritizing the creation of an intimate and supportive environment.

5. The project appropriates the Zoom platform to bridge geographical gaps between performers and audiences, fostering a sense of closeness even during periods of separation.
6. The project provides insights into how digital communication platforms can be utilized effectively for performance arts and audience interaction, particularly in the time of social distancing.
7. The scientific findings of this study will contribute to the understanding of the interrelation between in-group empathy and out-group empathy and could be used to promote empathy in our everyday lives. The anonymous data collected from the audience is still under analysis.

Publication 4 - Journal Article

Title: Act of Fiction - Simultaneously experienced multiple perspectives of (un)reality when engaging with narrative-based art.

Keywords: act of fiction, narrative-based art, suspension of disbelief, transportation, decision-making systems, the self, cognitive neuroscience, psychology, interdisciplinary, collaboration, ArtScience, real/fictional.

Research Approach: Conceptual/theoretical article.

Research questions:

1. There are always multiple perspectives to our surroundings in the brain activity. What, if anything, is the difference when experiencing art?
2. What is the brain mechanism that occurs during a narrative-based art experience?
3. How is this mechanism different from our decision-making systems?
4. Why is our response to narrative-based art so variable? What, if anything, can we do to enhance transportation?
5. Can we decode from brain activity when people are perceiving a story as fact vs fiction?

Research Contributions:

1. The article suggests that there is no “suspension of disbelief” but rather something more similar to our decision-making systems, enabling us to simultaneously be present in the real and the unreal (fictional).
2. The authors propose a new conception of the mechanism that occurs during a narrative-based art experience – the “Act of Fiction”.
3. The article offers a multidisciplinary approach to understanding the Act of Fiction, employing artistic research, social psychology, cognitive

neuroscience, and cognitive narratology for a comprehensive understanding.

4. One core assertion in the paper is that the Act of Fiction provides a safe space for emotional experimentation without real-world social implications, differentiating it from other goal-oriented systems.
5. The authors offer an experimental model using brain activity data that can advance our understanding of how the brain differentiates between states of reality and fiction.

A6. Elaborations on Key Terms

This section will elaborate on some key terms in the thesis by presenting a series of questions and answering them briefly. The questions are:

- Is it within the role of the artist and scientist to contribute to social and environmental change? (related to all thesis components).
- Why combine performance art and psychological experiments? (thesis components 1–3).
- Why focus on empathy as a tool for social change? (thesis components 2–3)
- What is the Self? (thesis component 4).

Is it within the role of the artist and scientist to contribute to social and environmental change?

Socially Engaged research, such as applied social psychology and socially engaged art, is still not taken for granted as “good practice” in either art or science. In socially engaged art (SEA), by definition, the artist is not creating in an isolated manner, behind the walls of her studio, but rather, with, and in relation to other people. The social aspect of this art form, along with its close relationship with political, sociological, and anthropological research methods, makes SEA controversial as an artistic practice. As Pablo Helguera explains, SEA is “specifically at odds with the capitalist market infrastructure of the art world: it does not fit well in the traditional collecting practices of contemporary art, and the prevailing cult of the individual artist is problematic for those whose goal is to work with others, generally in collaborative projects with democratic ideals” (Helguera 2011, p.4). On the other end, any attempts on a scientist’s behalf to step out of the lab and into the world, and to create socially engaged or applied science, has been criticized by philosophers of science, such as Philip Kitcher, as risking the research’s integrity by involving social and moral considerations (Kitcher 2001, p.49). Another common criticism speaks of applied research as controlled by its patrons, such as

governments, private entities, and non-profit organizations, who define the research questions according to their needs, to advance their specific goals. Another concern tied to applied research is the issue of inductive risk, which refers to the potential pitfall of making an erroneous inductive judgment, like accepting a false statement as true or rejecting a true statement as false. C.G Hempel, philosopher of science, identified that inductive risk is inherent to all kinds of scientific investigation – but is especially relevant in the context of applied science, which is concerned with finding answers to pressing questions, and thus has implications related to disputable social values. By all means, not all research could nor should be done in an applied manner. A traditional form of art or science (“basic science”) is still of high importance in today’s world. However, “basic research could not thrive without the data, the new phenomena and the new ideas that applied research discovers. Applied science on the other hand depends on basic science for its cultivation of methodological standards and general theoretical understanding” (Roll-Hansen, 2017, p.538).

Why combine performance art and psychological experiments?

The term "psychological experiment" brings up ethical concerns and even fear among some people. The combination of psychological experiments and performance art has a controversial history, that relates to the efforts of artists such as Marina Abramovic (namely in *Rhythm 0*, 1974) and Yoko Ono (namely in *Cut Piece*, 1964) to challenge the audience and trigger their cruel and objectifying tendencies. During the same era, some psychologists, such as Philip Zimbardo, shared similar objectives and approaches (Bottoms 2014, P.162). Zimbardo's notorious study, the Stanford Prison Experiment, conducted in 1971, sought to ascertain if the brutal behavior demonstrated by prison guards stemmed from their inherently sadistic personalities (i.e., dispositional) or was a consequence of the prison environment itself (i.e., situational). Interestingly, Zimbardo's experiment design was inspired by the theater plays of Luigi Pirandello and has been referred to as performance art rather than an experiment, since it lacked basic experimental conditions such as a control group (Ribkoff, 2013, p.1).

My long-term collaboration with Yossi Hasson leans on this tradition of blurring the line between psychological experiments and performance art but, unlike its mentioned predecessors, it aims to raise solidarity, empathy, and trust. We found several commonalities between performance art and psychological experiments. For example, we are looking at the performance space and the lab as two controlled environments that simulate “the real world,” albeit under controlled and manipulated conditions. Both fields require a sense of playfulness. We also create a correlation between the role of actors and the role of research assistants. Additionally, the performance setup could be seen as a psychological stimulus. However, we also see aspects that challenge this

interdisciplinary synthesis: while a psychological experiment focuses on a future audience (the readers of the resulting article), the very essence of performance art (especially when no documentation is allowed, such as in our projects) focuses on the moment and the people who are present in it. Also, while scientific research strives to define phenomena and symptoms clearly and precisely, art aims to be “free”, complex, and open to interpretation (Dorfles, 1994, p.85). By developing the potential of such collaborative projects, we create innovative and improved methods for the production of new and exciting interdisciplinary knowledge.

Why focus on empathy as a tool for social change?

The concept of empathy is multifaceted, with its definition and analysis varying significantly across disciplines (Cuff & Brown et al. 2016, p.144). My engagement with the topic of empathy is in the context of my work with social psychologist Yossi Hasson. At the time, empathy was the central focus of his research, and our collaboration has deeply influenced the perspective from which I approach this subject. Consequently, I will discuss empathy primarily from the standpoint of social psychology. Empathy can be seen as the ability to understand (cognitive empathy) and share others' emotions and thoughts (emotional empathy), often leading to feelings of sympathy and care for the distress others are experiencing (empathic concern). Outgroup empathy, or empathy towards individuals who are outside of one's social circle, is crucial for promoting conflict resolution and positive interactions among different groups.

While it is conducive to prosocial behavior, empathy often gets hindered by group boundaries. Typically, people exhibit lesser empathy for those they view as part of an outgroup compared to their ingroup. These biases are common in various intergroup situations where empathy lessens towards individuals who differ in aspects such as ethnicity, political leanings, religious beliefs, skin tone, gender, and other socio-cultural categorizations. The bias intensifies in situations where there are violent or contentious relationships between different groups, resulting in certain individuals possibly experiencing opposing empathic feelings, like deriving satisfaction from the distress of members of the outgroup (thesis component 2, p.2).

In the last decades, there has been a worldwide increase in politically supported dehumanization. The rise of nationalism, the refugee crises, and the increase in hate crimes can all be associated with ranking people from other groups and denying them the same level of humanity attributed to, the ingroup. People often value their own hopes, dreams, and aspirations as more important—or more human—than those of others (Smith 2011, p.27). From a social psychology perspective, dehumanization can be considered as the opposite phenomenon of empathy; when we fail to identify other people's pain as being as real as our own, we see and often treat them as less human than ourselves (Trawalter & Hoffman et al. 2012, p.7).

The decline in face-to-face communication due to social media, and the pervasiveness of racism and nationalism incited by multiple governments, undermine the basic act of meeting the Other (Drichel 2012, p.22). I believe that the artistic experience is one of humanity's most meaningful ways to attain openness and reflexivity and a potentially significant way to subvert these global tendencies. Empathy as the antidote to dehumanization is a central component in my collaborative practice with Dr. Hasson.

What is the Self?

In Plato's *Phaedrus*, Socrates explains the human soul as a chariot, led by a pair of horses and a charioteer. The white horse is obedient while the black horse is reckless and impulsive. The difference between the horses makes the chariot difficult to drive. Socrates argues that it is difficult for our "interior charioteer" – our soul, to see things as they really are, since it is constantly trying to balance between the two horses – the contradicting urges. They compete, struggle, and disturb one another.

This ancient concept of the soul is similar to the way many scholars today think about the structure of the self. For example, Redish argues that the self is a set of complicated decision-making systems constantly having different, and even conflicting needs. Often they even work simultaneously on different purposes (Redish 2015, p.4).

Bamberg posits that our behavior is dependent on context, and it is more fluid compared to our seemingly stable and unwavering sense of identity, or how we perceive ourselves. Despite changes in behaviors, we still regard ourselves as having a stable identity (Bamberg 2011, p.6). Higgins proposes that the idea of individuality, whether established relationship-wise or individually, is seen as vital for survival. Its main aim is to minimize uncertainties in our surroundings (Higgins 2018, p.437). Such a concept is rooted deeply in Social Identity Theory, where awareness of one's actions and predicting another individual's reactions facilitate reducing uncertainty (Hogg, 2016, p.8).

A7. Research Methods

This thesis includes innovative facilitation of **interdisciplinary research methods (IDR)**, in the context of **socially engaged research**. Interdisciplinary research methods engage researchers encompassing diverse academic backgrounds such as social sciences, environmental sciences, climatology, medicine, and less frequently, art. This form of research

integrates data, instruments, viewpoints, principles, and theories from at least two disciplines or domains of specialized knowledge to create something new by transcending disciplinary boundaries. The process of conducting interdisciplinary research can roughly entail outlining the issue at hand, substantiating the need for an interdisciplinary perspective, identifying the relevant disciplines, undertaking a literature review, achieving competency in all related disciplines, investigating the problem, examining each insight obtained, detecting contradictions among these insights and their origins, and finally, discovering or formulating a common ground (Tobi & Kampen et al. 2018, p.1211–1216).

Specifically, the methods involved in this thesis' interdisciplinary research include **artistic research** (led collaboratively by myself and Joshua Sofaer in component 4, and independently by me in all other components), **social psychology research** (led by Dr. Yossi Hasson in components 1–3 and expounded upon in component 2), and **cognitive neuroscience research** (led by Prof. Mikko Sams, incorporated in component 4). The methodology of these research components takes inspiration from the "Equitable ArtScience Collaborations" concept discussed in the first component of the thesis. Under this paradigm, artists and scientists share equal leadership and responsibility throughout the research.

Yet, it is important to acknowledge that being part of an interdisciplinary team does not imply mastery in all involved disciplines. Such a research framework demands an open mindset, a grasp of the basic principles of the contributing fields, and the ability to appreciate the value they bring to the collective effort. It allows for individual specialization, where complicated aspects of the research are best handled by those with expertise in that area.

For instance, Dr. Hasson conducted the intricate data analysis in component 2 due to his specialized knowledge of quantitative data analysis within the social sciences—a skill set I do not possess. This necessitated a reliance on Dr. Hasson's expertise to uphold the highest professional standards in this aspect of the research. Conversely, in the performance-experiment productions detailed in components 1–3, Dr. Hasson deferred to my expertise in the realm of film and performance directing. This enabled us to effectively manage large-scale performances and video productions integral to the research. Thus, successful interdisciplinary collaboration not only appreciates the value of individual expertise but also leverages it to collectively construct a comprehensive research venture.

A8. Research Ethics

This section refers to thesis components 1–3, which involve the synthesis of performance art and social psychology experiments and include data gathering from the audience-participants. Ethical considerations are fundamental in our approach towards addressing societal issues, shaping our relationships with both our collaborators and those who participate in our projects as audience members and research participants. It is critical to note that not only are our experiments consistently approved by academic ethics committees and abide by relevant ethical regulations, but we also ensure that all participants give informed consent for their involvement and for the publication of any captured images in our documentation. We also prioritize anonymity in data collection for all project participants.

The performance-experiment projects under discussion are centered on the dynamics of intergroup relations, specifically addressing the empathy exhibited by members of dominant groups towards those of marginalized groups across various societies. In this context, there is a deliberate choice to engage with individuals from dominant groups in order to confront and reevaluate their preconceptions and biases. These projects consciously refrain from targeting members of marginalized communities, including immigrants and refugees, on the grounds that short-term external interventions are unlikely to adequately address the complexities of such communities. Furthermore, we oppose the exploitation and cultural appropriation of these groups.

When incorporating written testimonies, we prioritize utilizing texts authored specifically for educational and political aims by migrants and refugees. Our objective is to sidestep postcolonial portrayals that objectify "the other" (Drichel 2012, p.26–27). Additionally, in our collaborations with performers from marginalized groups, including Palestinians and African Americans, we collaborate with the performers on writing and revising the narratives used in the performance (see further elaborations of our working techniques with performers in component 1 and in the description of component 3).

Given that our projects constitute a blend of participatory performance art and social psychology experiments, it is essential for us that we surpass the standard expectation of consent forms. We aim to ensure our participants have a comprehensive understanding of what their experience will entail. All public relations materials for our projects clearly state that participating in the performance also implies contributing to a social psychology experiment. This gives the prospective attendees an understanding of what to expect when they arrive at the venue. Additionally, our team always positions a member at the entrance of the venue to welcome visitors, clarify the event's outline, and respond to any potential queries.

Moreover, we ensure our participants have access to the results of our experiments via a link or text message. This allows them to gain a deeper understanding of the experiment they were involved in and how their individual anonymized data contributed to the overall study. This method of feedback not only maintains transparency but also fosters a sense of inclusion and acknowledgment for our participants, enhancing their overall experience with the project. Thus, we prioritize ethical considerations at every stage of our project, from planning to execution and follow-up, to ensure rigorous adherence to regulations and a deep sense of respect for all those who partake in our endeavors.

B - Research Contributions

B1. Preface

In this section, I will concentrate on the significant contributions of my thesis research. These are categorized into three primary themes: ArtScience Collaboration, found throughout all components; Performance Art and Social Psychology, found within components 1 to 3; and Narrative-Based Art and The Mind, which is the focus of component 4.

After delineating these themes, I will proceed to provide an in-depth description of the third component - *Relative Distance*, a performance-experiment that serves as a peer-reviewed artistic component in this thesis. I will conclude this section by presenting the remaining components, namely 1, 2, and 4, which are journal articles.

B2. ArtScience Collaborations

The thesis draws from extensive experience in synthesizing art and science to affirm that equal collaborations between these domains can bring innovative solutions to Wicked problems (RQ1, RQ2, RQ3, components 1,2,3). It underlines the scarcity of such equal partnerships in the existing frameworks and encourages a shift in the collaboration paradigm, promoting all

collaborators as equal leaders with the freedom to venture beyond their conventional expertise. This approach is designed to catalyze innovation and foster outcomes that exceed the individual contributions of the involved partners.

Another innovative concept presented is that artists are valuable contributors in the context of societal and environmental research, and should be included in such large-scale initiatives (RQ2, components 1). Art has a unique capacity to shed light on various dimensions of a study, often presenting surprising insights into the research subject and methodology. Artists' proficiency lies in an open-ended, experimental practice often referred to as 'fictioning'; this unique approach emphasizes subjectivity and personal experience while speculating on and shaping new ways of existence.

Interdisciplinary research is rapidly evolving, and tools that focus on improving interdisciplinary work are emerging. However, the findings of my thesis indicate that most existing research pertains to collaborations between different scientific disciplines rather than between artists and scientists. Furthermore, the toolkits and guides available do not provide adequate support for ArtScience collaborations. I find that collaborations between art and science are often more complicated than other interdisciplinary collaborations, for reasons mentioned in Component 1. To facilitate these collaborations, we need more than the existing toolkits. We need a process that acknowledges the epistemological and methodical gaps in ArtScience collaborations, along with the underlying power dynamics and cultural differences.

Component 1 concludes with a link to a list of recommendations for successful ArtScience collaborations (RQ1) that I created with Yossi Hasson based on our shared experiences. Since one of the main purposes of writing this thesis is to provide valuable insights to others regarding their collaborative practices, I choose to include it here:

Recommendations for Successful ArtScience Collaborations

The purpose of this list is to provide basic guidelines for promoting collaboration between the fields of art and science. It offers principles that emphasize the importance of promoting openness in terms of knowledge and methods, to enhance understanding and find interconnected solutions to complex problems.

Getting started

- Having a positive impression of one another and enjoying conversation is crucial for successful collaboration. Conversely, if there is a lack of basic chemistry, it may be a sign that one is collaborating with the wrong person.
- It is recommended that each collaborator become familiar with the discourse, concepts, and methodologies from outside their field. This includes taking into consideration different investigative timeframes, data sets, and analyses. By reviewing background material provided by the other collaborators, the team can work on establishing a common vocabulary and gaining the confidence and capability to engage in professional discussions that acknowledge the distinctions and similarities in the different professional practices.
- Being a member of an interdisciplinary team does not mean you have to be an expert in all the fields involved. However, it does require an open-minded attitude and an understanding of the fundamental principles and potential benefits of other contributing disciplines. To ensure effective communication, it is important to explain key terms and concepts in detail, even if they seem basic to you.
- Transparency is key to building trust in collaboration. Be open about your goals, expectations, and limitations.
- It is preferable to not just have an interest to collaborate, but also the beginning of an applicable idea of what you could collaborate on. This will ensure that all sides understand and share a goal and can lead to a clearer work process.
- A true collaboration involves two or more individuals who share gains and losses. All partners should have a high stake in the project, meaning that all will benefit or suffer from its success or failure.
- It is essential to prioritize the project and ensure that all partners are genuinely committed. This helps establish trust and prevent potential frustration.

Working together

- To ensure equal opportunities, representation, and communication for marginalized groups or individuals, partners need to establish

and adhere to Safer Space guidelines. These guidelines should foster an atmosphere of respect and understanding, free from oppressive behaviors, where struggles are acknowledged and dialogues are cultivated.

- In highly diverse collaborations, such as ArtScience, it is essential to involve the participating disciplines in every phase of a project, making sure that their perspectives are considered in all formulating and planning stages, especially in defining research questions and objectives. While this method may be more time-consuming, it ultimately results in higher-quality contributions and enhances the legitimacy of the proposal.
- One should not be afraid to aim high and take risks when setting goals for the project, as it can lead to more innovative ideas and discoveries.
- It is important to have a detailed plan in place, to ensure that each aspect of interdisciplinary work benefits from the knowledge, data, and evidence of the various fields involved. Additionally, it is crucial to reflect on and collaborate during the investigation process to enhance its quality. This can be accomplished by establishing areas for creativity and open dialogue.
- As collaborators, it is recommended to be open-minded and willing to question our own assumptions. We should all ask ourselves fundamental questions such as “Why am I working in this way?” and “Is it possible to work differently?” We should also be willing to learn from our partners and adopt their methods if they are effective. It can be intimidating to question our own processes in front of others, and it takes courage and confidence to do so. However, the potential for innovation and breakthroughs makes it a risk worth taking.
- To achieve effective interdisciplinary practice, we must prioritize communication and participation. A culture that values equal power and autonomy among team members is crucial. By improving communication practices and fostering respect and trust among different disciplines, we can create an environment where everyone can thrive.
- To foster productive interdisciplinary collaboration, it is important to discourage multitasking and promote active listening during meetings. Engaged listening is crucial for enhancing creative and attentive interdisciplinary work. By genuinely listening, a dedicated space is created for reflection, which helps to identify shared and divergent elements across disciplines consistently.

- To ensure equal representation and avoid any power imbalances, the institutional framework and project budget should reflect the interdisciplinary nature of the project. It would be best if the hosting institution is not biased towards any one collaborator but rather a neutral institution, or alternatively a collaboration between several institutions that are supporting the different disciplines involved. The project should also be funded by a benefactor who does not prioritize one discipline over the other. Funding should not be conditioned by a single disciplinary-specific outcome, or joint funding of the different disciplines involved should be considered.
- Developing trust is a crucial aspect when encountering unfamiliar practices or disciplines. Trust implies having confidence in the competence and knowledge of the person introducing us to foreign practices. Additionally, trust becomes even more significant in situations where one's progress or work depends on the actions or contributions of their collaborator, such as completing writing tasks, providing necessary materials, or gathering data.
- When working with people from different fields, it is common to encounter conflicting requirements from their respective processes. In such situations, it is crucial to remain receptive to constructive discussions and explore innovative alternatives that might require deviating from traditional practices.
- The tension between the artistic and scientific methods can be felt in all aspects of ArtScience projects and can affect everyone involved, from project leaders to research/production teams, funding entities, communication specialists, and the audience/participants. It is important for organizers to recognize that everyone is operating in unfamiliar territory and work to communicate and mediate any unfamiliar aspects. Otherwise, there may be room for misunderstandings and unfulfilled expectations, which can lead to frustration.
- Collaborating across different fields allows you to learn new skills and navigate unfamiliar elements that are outside of your and your collaborator's expertise. The joint project is a new cross-disciplinary entity and therefore can require unpredictable and new knowledge to emerge.

B3. Performance Art and Social Psychology

It is evident from components 1–3, that performance art and social psychology intersect in the realm of experience, empathy, and the understanding of human interaction and behavior. Both aim at studying human behaviors and emotions, often in a social context. Their synthesis provides a unique blend of creativity and empirical analysis that can enhance research processes.

The advantages of integrating performance art with social psychology are numerous (RQ3). Firstly, it can make the audience become actively involved in the research process by creating a more immersive and participatory experience through the blend of theatre and psychology methods. Additionally, this approach can create a more authentic, expressive, and engaging study design while offering creative solutions to scientific challenges. Actor-based methods further have the potential to increase the research's external validity and contribute to bridging the gap between academia and public understanding. The inclusion of an artistic perspective can lead to innovative scientific representation methods, turning technical procedures into more engaging and educational processes. The artistic aspect of a project can enable participants to reflect on their thoughts and feelings, leading to new findings or yet-to-be-explored research topics. It allows the scientific aspect to take on a more personal and humanizing role, which can be much more impactful for participants.

The integration of science into performance art provides personal and socio-cultural benefits and can significantly enhance the depth and value of the performative experience. By introducing an evidence-based perspective to the primary emotional and subjective realm of performance art, it grounds the experience in factual reality and contributes to its intellectual depth. Performances designed with scientific methods invite the audience to actively examine their own thoughts and feelings. For instance, an experiment regarding empathy can encourage participants to analyze their own levels of empathy in relation to other participants, fostering greater self-awareness and psychological growth (RQ4). Additionally, the science-backed experimental aspect offers the audience an opportunity to contribute to social change-related research, equipping them with a sense of active participation and agency. Instead of merely experiencing an artistic reflection on a subject, they can engage in the process of generating new knowledge that can potentially influence society at large. In this way, the incorporation of scientific elements into performance art extends its reach and potential, weaving together intellectual engagement, emotional richness, and actionable insights into one cohesive experience. This synthesis of science and art offers audiences a

uniquely transformative experience that is both personally meaningful and broadly impactful.

However, the synthesis of performance art with social psychology can also present challenges. For example, controlling all variables and avoiding potential bias can be difficult in an uncontrolled theatre setting. Also, balancing the need for artistic expression and individuality among performers with the scientific need for uniformity and sameness among experimental conditions can prove challenging. Bridging disciplinary languages and reconciling differing epistemological and methodical perspectives can also be demanding. And, as the process is experimental and ambitious, it requires more time, effort, and flexibility, potentially leading to a more complex and labor-intensive working and learning process. Another hurdle that made this synthesis difficult for us and may be encountered by other ArtScience collaborators as well, is the scarcity of appropriate funding opportunities (such that are willing to support both scientific and artistic processes). Additionally, we encountered a higher rate of rejections than I was accustomed to in my artistic career, from both artistic and scientific platforms. The common thread in these rejections was skepticism about the project's fit within traditional disciplinary boundaries. For example, reviewers from scientific journals questioned our projects' alignment with scientific research by labeling them more as artistic endeavors, while art curators suggested they belonged in scientific contexts rather than performance venues. Nonetheless, despite these challenges, the synthesis of performance art with social psychology can offer many enriching opportunities for insightful and innovative research.

In terms of societal impact, our performance-experiment projects focused on empathy, aiming to understand what drives people to feel (or not to feel) empathy in an intergroup context and to develop interventions that can promote empathy toward others. The significant findings are that an indirect intervention that targets people's general belief about empathy led to greater prosocial emotions and behavior in conflictual intergroup contexts where empathy is most needed. In other words, our projects were successful in elevating the empathy levels of dominant groups members towards minoritized groups members in different societies, and therefore contributing to social change (RQ4). This work will be extended in the framework of Hasson's position as Director of Research at the aChord Center at the Hebrew University which promotes applied research in education, employment, academia, and more. We intend to incorporate this intervention into aChord's tool kit and implement it in various domains.

B4. Narrative-Based Art and the Mind

Component 4 introduces notable progress in the understanding of how narrative-based art influences the mind (RQ5). We question the theory of 'Suspension of Disbelief' and argue that we never truly suspend our awareness of what is real and what is fictional while engaging with narrative-based art. Instead, we argue that two processes at play in our minds, known as the level of transportation and reality monitoring, facilitate our simultaneous presence both in reality and within the fictional narratives of the art. Reality's mechanisms seep into narrative art, and emotions and thoughts manifested in fiction seep back into reality.

Therefore, we propose a more fitting term for this experience: the 'Act of Fiction'. Drawing on social psychology, cognitive neuroscience, and cognitive narratology, we aim to further understand the Act of Fiction. We provide a comprehensive literature review of narrative transportation, which is "the state of feeling cognitively, emotionally, and imaginatively immersed in a narrative world" (Sestir & Green, 2010, p.275). This research expands the concept of transportation beyond just literary texts, applying it to all forms of narrative-based art. While we acknowledge the significance of narrative transportation in understanding the cognitive processes involved in the Act of Fiction, we also highlight a limitation in this research area, as it often depicts transportation into a narrative on a single, linear scale from low to high, without considering the reality monitoring aspect.

We argue that narrative-based art takes a unique role in our mental functioning. It offers models and simulations of social behavior, as well as a safe yet immersive platform for practicing interpersonal relationships. It is within this safe environment, characterizing the Act of Fiction, that we can emotionally navigate negative consequences and failures without dealing with the aftermath, as would be necessary in real life. This is how the Act of Fiction distinguishes itself from other goal-oriented systems within oneself.

However, we recognize that even with a captivating narrative, the Act of Fiction might not necessarily occur. We hope that with advancements in cognitive neuroscience, we might gain more insights into the neural processes that activate the Act of Fiction and thus understand more about what makes narrative-based art resonate with us.

We discuss the complexities of distinguishing between brain activity during reality and during fiction. On brain scans, these processes could look strikingly similar. So how could we trace the differences in brain activity during reality *vs* fiction? We pose this research question as a first step for future understanding more about fiction and the brain. We created an experiment outline in the hope that it would help advance this research topic. This experiment design is based on findings from research done with psychotic patients while they are immersed in unreal scenarios.

The proposed experiment involves subjects undergoing a functional Magnetic Resonance Imaging (fMRI) scan while listening to a narrative framed in two different ways: once as a factual account and once as a fictional drama. By examining any differing brain activations under these two conditions, the research could potentially contribute to a better understanding of how our brain differentiates between fact and fiction.

Through all this, our research intends to make a significant contribution to the understanding of the unique cognitive processes involved when we engage with narrative-based art. Despite the advancements in our understanding, we acknowledge that there is still a long road ahead, as we continue to uncover the intricacies of the human brain and its interaction with fiction and reality.

B5. Description of the Artistic Component (3) and its Place in the Thesis.

Relative Distance, a performance-experiment by Einat Amir and Yossi Hasson Presented online, as part of Kampnagel theatre programming, Hamburg, May 2021.

Performance Credits:

Artistic and Scientific research: Einat Amir, Yossi Hasson.

Visuals: Lali Fruheling.

Text contributions and performative consulting: Risha Tenae.

Performers: Krystel Mcneil, Nevada Montgomery, Eliza Myrie, Risha Tenae.

Hosts: Janika Heun, Lee Cockshott, Sophie Pulkus.

Costumes and production assistance: Vidushi Lohia.

Supported by: Körber-Stiftung, Kampnagel Hamburg, Artport Tel Aviv, Hyde Park Art Center Chicago.

Examiners of the artistic component: Tellervo Kalleinen and Temi Odumosu.

In a continuing collaboration with empathy researcher Yossi Hasson, we created a participatory performance synthesized with a psychological experiment. The endeavor involved direct one-on-one interactions between the audience members and the performers. The project was conceived in 2020 and presented in 2021 during the challenging time of the COVID-19 pandemic. At that time of multifaced crisis in health, economy, and social perspective, solidarity and empathy toward each other were in especially great need (Addo, 2020, p.3–4). This project is a continuation of our previous performance-

experiments described in components 1 and 2. In this case, we created a participatory performance that is also a real-time psychological experiment, in which empathy is discussed, questioned, and experienced. The project reflected on the relation of dominant groups towards members of minoritized groups in different societies in light of the COVID-19 pandemic. Scientifically, we aimed to increase the level of empathy of the German audience toward those who are less seen and less considered – in this case, the minority of Muslim refugees in Germany.

We created an online performative meeting format, where a German audience is invited to have one-on-one conversations with actresses from the US. The meeting began with looking at the pandemic in the German context by reading two real testimonies (see annex 3); one of a Syrian refugee in Germany, and one of a German-born citizen. This part of the performance was also a psychological experiment about empathy. Half of the participants were presented with the testimony of the German citizen first and the refugee's testimony second, while the other half were presented with these testimonies in the reversed order. After each testimony, the participants were interviewed and asked about their empathy level. Our hypothesis, based on our previous studies (see component 2) was that empathy towards the out-group (refugees) will not detract from empathy towards the in-group (Germans). In contrast, empathy for the in-group will detract from empathy toward the out-group, and therefore participants who will be presented with the refugee's testimony first will express more empathy towards the out-group.

Following the first part that presented the German testimonies, the performance-experiment continued in a more free-formed performative direction, meaning, the following parts were less tied to the restrictions dictated by the rules of a data-gathering questionnaire. However, the performance-experiment kept its semi-scientific performative tone.

This 30-minute-long experience contained multiple layers of meanings and invited different readings from its participants. These layers were created by mixing content from different worlds and by collaborating and inviting multiple partners to contribute to the project. Here are some of the unique aspects that composed *Relative Distance*:

- The project used COVID-19 as a platform for reflection on difficult subjects, such as privilege, racism, and bias. It was constructed with partners of different ethnicities and nationalities.
- The project brought different testimonies of how COVID-19 acted as a greater divider and hit hardest the ones who are marginalized and neglected in different societies. The main characters whose testimonies were performed in the work were portrayed by African American performers from Chicago IL, US. These performers were chosen because we had worked with them before and trusted their professionalism and talent, and also

because working with them provided us with a chance to include an alarming example of how COVID played into systemic racism. The virus significantly impacted the African American community in Chicago, who despite only constituting 33.3% of the city's population represented fifty-two percent of the city's confirmed cases and an alarming seventy-two percent of deaths. (CBS News, 2020).

- Risha Tenaе, one of the performers, also acted as a contributing writer and performance consultant. She composed the closing text of the performance, which was a COVID-related testimony from a fictional character based in Chicago and of African-American origin (see annex 2). This character was a product of fiction but was created using the real-life experiences of Tenaе and her family members. The challenge undertaken by Tenaе was to create an emotional-educational experience that led participants to contemplate their own privileges and potential biases. However, this was done with consideration of the emotional well-being of the performers, achieved by creating a deliberate distance between the character and the performer portraying it.
- We also included a text that discussed COVID-related discrimination and privilege in Israel-Palestine (see annex 2), where Hasson is based and where I am from. Overall, the project brings testimonies from three different parts of the world: Germany, where the commissioning theater is located, Israel-Palestine where Hasson and I are from, and Chicago, where the performers resided. Finally, the participants were invited to share their own stories, providing an additional testimony if they wished to do so.
- Another collaborator we invited to this project was visual artist Lali Fruheling. Fruheling creates digital art that deals with the domestic space. We invited Fruheling to create custom-made domestic backgrounds for our online meeting platform, as a playful takeoff on the COVID quarantine situation, and the intimacy that was revealed (or in this case, not revealed since the digital backgrounds hide the actual domestic spaces of the performers) while we all interacted digitally from home. Fruheling's images referred to danger, chaos, and destruction of the domestic, reflecting on the loss of sense of safety, and the constant overexposure we experience.



Fig. 3. Lali Fruheling, four domestic backgrounds for online meeting platform, still image from digital animation. commissioned for *Relative Distance*, a performance-experiment by Einat Amir & Yossi Hasson, 2021.

This work combined a series of questions and activities that were designed to stimulate and challenge the audience on visual and emotional levels. It blended controversial and sensitive issues like our feelings towards exiles and refugees who arrive in “our” countries, and it confronted the participants’ national identities and sense of belonging. While it addressed challenging and emotional topics, it also employed humor and performative techniques to foster a lifting experience of closeness and solidarity. We effectively leveraged the online meeting platform to facilitate an encounter that connected performers and audience members from disparate parts of the world. This created a distinctive moment of intimacy during a period characterized by social distance.

Venue, Time, and Form of *Relative Distance*

This project took place in the framework of being granted a production residency focusing on the theme of ‘EXILE TODAY’ by Kampnagel Theater and Körber Foundation. Kampnagel Theater in Hamburg is Europe’s largest production center for contemporary performing arts. The Körber Foundation is a German non-profit entity that offers a platform for dialogue on current political subjects and also formulates operational projects addressing social and political concerns.

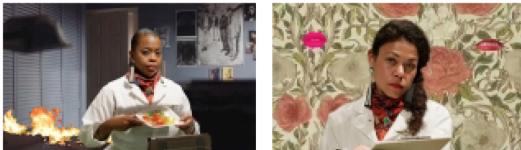
In late 2019, we applied for a production residency, which was later announced as successful. Originally, the funding was meant for a production to be held in May 2020 at Hamburg Theater. However, due to the global spread of COVID-

19 and subsequent restrictions in Europe, we had to work closely with Kampnagel Theater's curator Uta Lambertz, and production manager Christine Focken to adapt our proposal to the changing conditions. The production was postponed multiple times, and adjustments were made to accommodate the new circumstances. Finally, in March 2021, after a prolonged cultural shutdown in Germany, we decided to create a fully digital version of the project, utilizing an online meeting platform. The performance premiered on May 14, 2021, and was accessible for three weeks through Kampnagel's website (see annex 1).

The project's process and analysis contributed to an artistic research paper, discussing the unique collaborative process of creating this project, and the motivations behind it (component 1). The scientific findings of this study will contribute to the understanding of the interrelation between in-group empathy and out-group empathy, and could be used to promote empathy in everyday life. The anonymous data collected from the audience is still under analysis. It will result in a scientific paper that is a continuation of component 2, focusing on empathy measurements in the context of relationships between different groups in society.

EINAT AMIR & YOSHI HASSON:

RELATIVE DISTANZ



Art / Theory / digital / Wheelchair users

As part of a long term collaboration, the artist Einat Amir and the social psychologist Yossi Hasson had created a participatory performance combined with real-time psychological research. The project will consist of one-on-one performative meetings between performers and audience members, through an online platform.

During the time of COVID 19 crisis, people around the world are facing common but also different challenges. In this meeting those challenges will be shared in an artistic – performative perspective. This project contains a mix of questions and actions that

Duration: 30 Min.

Tickets: 7 Euro. In English.

One-on-one meetings via Zoom at various time slots from 16:00 to 21:15. For the time selection, please click on the ticket link of the desired day.

Fri, 14.05.2021 from 16:00 [Online]

TICKETS

Sat, 15.05.2021 from 16:00 [Online]

TICKETS

Sun, 16.05.2021 from 16:00 [Online]

TICKETS

Relative Distance - Annex 1

challenge the audience, both visually and emotionally, with confronting our own identities and sense of belonging. The data collected from the audience will be processed as a new research in the context of intergroup relationships.

The performance will deal with challenging subjects, but will also use humor and performative techniques to create an elevating experience of intimacy and solidarity. The online communication platform will provide the opportunity of a meeting between performers and audience from two different sides of the world, creating a unique moment of closeness in a time of distance.



Wed, 19.05.2021 from 16:00 [Online]

TICKETS

|

Fri, 21.05.2021 from 16:00 [Online]

TICKETS

Sat, 22.05.2021 from 16:00 [Online]

TICKETS

Sun, 23.05.2021 from 16:00 [Online]

TICKETS

Wed, 26.05.2021 from 16:00 [Online]

TICKETS

Thu, 27.05.2021 from 16:00 [Online]

TICKETS

Fri, 28.05.2021 from 16:00 [Online]

TICKETS

Sat, 29.05.2021 from 16:00 [Online]

TICKETS

Sun, 30.05.2021 from 16:00 [Online]

TICKETS

Wed, 02.06.2021 from 16:00 [Online]

TICKETS

Thu, 03.06.2021 from 16:00 [Online]

TICKETS

Fri, 04.06.2021 from 16:00 [Online]

TICKETS

Sat, 05.06.2021 from 16:00 [Online]

TICKETS

Sun, 06.06.2021 from 16:00 [Online]

TICKETS



Art and Scientific research: *Einat Amir, Yossi Hasson* / **Visuals:** *Lali Fruheling* / **Text contributions and performative advice:** *Risha Tenae* / **Additional Research:** *Mikke Tavast, Mathias Piispanen* / **Academic supervision:** *Eran Halperin, Mikko Sams, Anniina Suominen* / *Research conducted in Aalto University Finland and The Hebrew University Israel* / **Hosts:** *Janika Heun, Lee Cockshott, Sophie Pulkus* / **Performer:** *Krystel Mcneil Nevada Montgomery, Eliza Myrie, Risha Tenae* / **Costumes and production assistance:** *Vidushi Lohia*

Supported by: Körber-Stiftung, Kampnagel Hamburg, Artport Tel Aviv, Hyde Park Art Center

*This performance is part of Einat Amir's dissertation for a doctoral degree in the Department of Art and Department of Neuroscience and Biomedical Engineering, Aalto University Finland.

Relative Distance - Annex 2

Israeli testimony by Yossi Hasson and Einat Amir

We, the creators of this project are coming from Israel. While it seems that Israel succeeded in vaccinating a large portion of its population, there are groups in society that were hit harder by the COVID crisis. Those people belong to minorities and disadvantaged groups. The number of death cases among elderly people from minorities such as the Arab population is almost 3 times higher, and in the ultra-Orthodox community death rate is almost 4 times more than in the general majority.

The economic disruptions caused by the COVID, led million people to lose their jobs. But even here, there were groups who suffered more. More women lost their jobs, and especially Arab women and ultra-Orthodox women. There were also a higher percentage of lower class and disabled people who were fired.

This situation expands the gaps and inequality between groups in society as the disadvantaged groups become even more disadvantaged.

And what about the Palestinian people who live in the territories controlled by Israel? While Israel has vaccinated about 55% of its population, less than 1%, specifically only 0.3% of the Palestinian people are vaccinated. That means that a person is 183 times more likely to be vaccinated in Israel than in Palestine. Does it make sense? Is it how vaccinations should be distributed?

Chicagoan Testimony by Risha Tanea

“Of all the forms of inequality, injustice in health care is the most shocking and inhumane.” Dr Martin Luther King Jr. made that statement in Chicago in March of 1966, but it might as well have been in Chicago in March of 2020.

The surge in Covid cases between Thanksgiving and Christmas was significant, but expected. CDC officials told us all that there would be an explosion in positive cases, and consequently, deaths. I was not surprised by that. What I was surprised by were the percentages. In Chicago, 52 percent of confirmed cases and 72 percent of deaths were in the Black and Latino communities. The total combined Black and Latino population in Chicago is 32.6 percent. As surprising as those numbers were, I was absolutely stunned by how close it would hit home.

During the 5 week period between Thanksgiving and New Year’s Eve, the Holiday Season, I learned of numerous family members and friends who were diagnosed with the covid virus. It was a daily occurrence. And, eventually, it included my sister and both of my parents. My mother spent 8 days in the ICU. By the time we made it to January of the new year, 5 of those individuals were dead. While they had varying levels of education, socioeconomic status, and health, the one thing they all shared in common was being Black and Latino. “When a disease like covid lands it falls directly on the map of inequality that existed already”

Relative Distance - Annex 3

The German testimonies.

*Since these testimonies are the stimulus of the psychological research, comparing the participants' empathy level between them, they had to be "unified" and "mirror" each other in their structure and information.

The story of Mohammed

I could pretty much manage my life until I was found positive for COVID-19. After fleeing from Syria a few years ago, I have been living with my family in a small apartment in Hamburg. A neighborhood of many other refugees. In Syria I studied political science and literature but here in Germany I found myself working in a catering company.

One day after returning late from work I got a fever. A few days later it became hard to breathe. I wish I would have been more careful, but now it's too late..

I was hospitalized five days ago. The nurse said I might need to be connected to a ventilator. The medical staff does not know how long this is going to continue and I am worried it will deteriorate further.

I also lost my job. The catering service let all the employees go because there were no event bookings for months. So I cannot provide for my family anymore. Not even for basic food.

I have my wife, Fatima, and my two little kids back home. Isolated with no one to help.

We feel uncertainty and distress and don't know what will happen in the future. How long can we continue like this?"

The story of Alexander

Things were quite ok, until the pandemic started, and I was infected with the Corona disease.

After years of living in a small flat, me and my family could afford moving to a bigger one in Veddel. A lower-class neighborhood southern to the river in Hamburg. I have an academic degree, yet I couldn't find a professional job, so I work as a delivery man.

This work involves close contact with many people on a daily basis, and I sort of knew it is a matter of time till I will get infected. And I did. I assume I could have been more cautious, but there's nothing I can do now.

At first I thought I was just having a cold, my wife urged me to get tested. Later, I started having trouble breathing, so I was hospitalized. The doctors said that my oxygen saturation levels are "alarmingly low" and that with my medical background, things might get worse.

Meanwhile, I can't get back to work so we're having trouble paying bills.

It's very difficult to continue this way, and I have to get back to my wife Maria and kids. How long can we live in such condition?

C- Summary

C1. Research Conclusions

This thesis reflects on the power and the possibilities of artists to change individuals and societies through art. It reflects on different ideas and actions in which art is an undeniable force that better humanity. This thesis is drafted in Finland, a country where recently, the Deputy Prime Minister and Finance Minister made a statement proclaiming culture as a "luxury service that, unfortunately, too much money is spent on in Finland at the moment" (Riikka Purra, pre-elections debate, 21.03.23). In light of such sentiments, that are currently trending all over the world, articulating and reiterating the importance of art in society becomes even more critical.

In the context of supporting a better society, this thesis contends the significance of art from the collective to the personal sphere: Component 1 answers the questions of why artists and scientists should work together and how such collaborations could contribute to society (RQ1, RQ2). Component 2 shows empirical evidence from multiple studies of how the synthesis of art and science, specifically performance art with social psychology, contributed to improving prosocial behaviors by elevating empathy towards individuals from marginalized groups in different societies (RQ3). Component 3 presents an in-practice example of synthesizing a social psychology field experiment with participatory performance art (RQ4). As an artwork rather than an academic article, this component offers an opportunity for experiential understanding through direct emotional and aesthetic engagement, as opposed to merely

analytical comprehension. Component 4 offers an explanation of the significance of art for the self (RQ5). It argues that engaging with narrative-based art serves as a safe space for emotional exploration, immuned from real-life social repercussions.

This thesis states the significance of equal collaborations between artists and scientists and provides empirical evidence of their impact on society. It not only argues for the importance of ArtScience interdisciplinary research but also showcases its potential to drive social change and contribute to a more inclusive and compassionate world. Contrary to the popular saying, "When the cannons are rumbling the muses fall silent," this thesis demonstrates the opposite. It shows that artists can and should act in difficult times, and that artists should be integral to all societal and environmental change initiatives, standing shoulder to shoulder with scientists. The synthesis of art and science in collaborative ventures offers enormous possibilities for innovative research. Beyond this, it has a multifaceted impact—it can educate, influence, and evoke change in individuals in multiple ways.

C2. Future Directions

This thesis is embedded with several avenues for future research across various disciplines, outlined in its components:

Component 4 offers a novel blueprint for future brain research, focusing on decoding brain activity associated with perceiving a story as fact versus fiction. This could pinpoint the primary neural structures or connectivity patterns underlying such decoding processes.

Components 1–3 provide practical tools, valuable insights, and methods that other researchers can adopt for interdisciplinary ArtScience, socially engaged research. These tools and methods are presented from both artistic and scientific perspectives.

Component 2 sets forth successful psychological-artistic interventions that significantly increased empathic behavior towards marginalized groups across different societies. These interventions can be further developed for broader application across various social groups. An intriguing area for future research, springing from components 2 and 3, could be an investigation into potential long-term elevation in empathy levels, beyond the immediate aftermath of the interventions.

Component 1 concludes with the introduction of a possible future research model: "Non-Binary Research". We coined this term as a foundation for a non-

essentialist research model where arts and sciences are not restricted as dichotomous options. Non-Binary Research is not opposed to its originating disciplines. Instead, it occupies the intersection; it is respectful of and builds on the knowledge systems that facilitated its inception while acknowledging that the complex, multifaceted nature of Wicked problems necessitates more fluid knowledge frameworks— knowledge that is not confined or restricted by disciplinary boundaries and can freely explore its creative expressions. In such a research model, collaborators could have the freedom to venture beyond their disciplinary expertise and collectively contribute to all facets of a project.

Finally, Component 1 also calls for the inclusion of artists side by side with scientists in large-scale societal and environmental research. I am currently delving deeper into this concept, with the objective of transforming it into applied socially engaged research.

C3. List of Figures

Fig. 1. Einat Amir & Yossi Hasson, *BasicAssumption*, 2017. Still image from a video shown in the performance-experiment.

Fig. 2. Root-Bernstein, Bob, Todd Siler, Adam Brown, and Kenneth Snelson. “Artsience Manifesto” *Leonardo* 44, no. 3 (June 2011): 192.

Fig. 3. Lali Fruheling, four domestic backgrounds for online meeting platform, still image from digital animation. commissioned for *Relative Distance*, a performance-experiment by Einat Amir & Yossi Hasson, 2021.

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This doctoral thesis explores the concept of synthesizing art and science, suggesting that equal collaborations between these fields can yield innovative solutions to contemporary 'Wicked' problems. It examines artists' vital role in shaping individuals and societies, emphasizing art as an impactful force that can foster a more inclusive, empathetic world.

Situated within the interdisciplinary domains of socially engaged research, ArtScience, and artistic research, this thesis has a special focus on the synthesis of participatory performance art and social psychology as a methodology that can contribute to intergroup relations. The synthesis of art and science in collaborative ventures offers enormous possibilities for innovative research. Beyond this, it has a multifaceted impact—it can educate, influence, and evoke change in multiple ways.



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